

Application No. 10/660,687

Reply to Office Action

*REMARKS/ARGUMENTS**The Pending Claims*

Claims 1-4 and 6-17 are currently pending. Claims 1-4 and 6-17 are directed to a composition for planarizing or polishing a composite substrate.

Discussion of the Claim Amendments

Claim 1 has been amended to recite concentration ranges for the base and abrasive. Support for these amendments can be found, for example, at page 5, lines 27-29, and page 3, lines 25-28, respectively. As a result of referring to a concentration range for the abrasive, the claims have been streamlined to recite a polishing composition (rather than a system comprising a polishing composition). In addition, claims 5 and 6 have been canceled. No new matter has been added by way of these amendments.

Summary of the Office Action

The Office Action rejects claims 1-12 and 15-17 under 35 U.S.C. § 103(a) as allegedly unpatentable over International Patent Publication Number WO 00/00560 A2 (Steckenrider et al.). The Office Action also rejects claims 13-14 as allegedly unpatentable over Steckenrider et al. in view of U.S. Patent 5,938,505 (Morrison et al.).

Discussion of the Obviousness Rejections

The Office Action asserts that Steckenrider et al. discloses a polishing composition comprising fluoride ions, an amine, a base, water, and an abrasive. The Office Action further asserts that there is no evidence of criticality associated with the particular composition recited in the pending claims and that, therefore, the particular composition recited in the pending claims would have been obvious to a person of ordinary skill in the art as a result of routine experimentation. For the reasons delineated below, Applicants respectfully traverse the obviousness rejections.

In order to arrive at the composition recited in the pending claims, the compositions disclosed in Steckenrider et al., would have to be modified in a way that would render the compositions unsatisfactory for their intended purpose as set forth in Steckenrider et al.

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Accordingly, the claimed composition cannot be considered obvious in view of the disclosure of Streckenrider et al. *See* M.P.E.P. 2143.01.

The intended purpose of the compositions taught in Streckenrider et al. is "polishing conductive and semi-conductive layers and thin-films with high selectivity to ILD [interlevel dielectric] materials" (p. 4, lines 6-8). Specifically, the compositions taught in Streckenrider et al. "have high polysilicon (Poly-Si) polishing rate. In addition, the chemical mechanical polishing slurries of this invention exhibits [sic] desirable low polishing rates towards dielectric (PETEOS) insulating layer" (p. 8, lines 8-11). PETEOS is a substrate containing silicon oxide. Thus, the polishing compositions disclosed in Streckenrider et al. have a low polishing rate with respect to silicon oxide.

One of ordinary skill in the art would not be motivated to modify the compositions taught in Streckenrider et al. to comprise about 0.5 wt.% to about 10 wt.% of a source of fluoride ions (as recited in the pending claims) because fluoride ions were known to etch silicon oxide. For example, U.S. Patent 5,783,495 (Li et al.) (Doc. No. BG on Applicants' IDS filed on September 11, 2003) discloses an aqueous cleaning solution comprising HF. Li et al. teaches that HF etches native oxide, the thin oxide layer that grows on silicon, "and provides a hydrogen passivated oxide free silicon surface" (col. 2, lines 10-12). Therefore, it was known to those of ordinary skill in the art that HF has a low etching rate with respect to polysilicon but a high etching rate with respect to silicon oxide. Moreover, HF also quickly etches other oxides such as BPSG and TEOS based oxides (col. 2, lines 17-24). This is demonstrated in Example 1 of Li et al. in which BPSG and thermal oxide layers are rapidly removed with a 1% HF solution. Thus, the prior art teaches that the proposed modification to the compositions disclosed in Streckenrider et al. would decrease the selectivity for conducting or semi-conducting layers to dielectric, i.e., silicon oxide, layers by increasing the removal rate of silicon oxide and would render the compositions unsatisfactory for their intended purpose. Accordingly, one of ordinary skill in the art would not have been motivated to modify the compositions in Streckenrider et al. in the manner necessary to arrive at the composition defined by the pending claims. Under the circumstances, the claimed composition cannot be considered obvious in view of the disclosure of Streckenrider et al.

With reference to claims 13 and 14, the Office Action concedes that Streckenrider et al. does not disclose a particular selectivity of oxide:nitride removal. However, the Office

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Action asserts that the teachings of Morrison et al. provide evidence that the polishing compositions disclosed by Steckenrider et al. would have the recited selectivity of oxide:nitride removal.

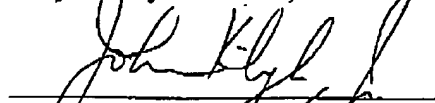
Applicants disagree with the Office Action's assertion that the compositions in Morrison et al. employ similar components as the compositions disclosed in Steckenrider et al. All of the compositions in Morrison et al. contain hydrogen peroxide, but the compositions of Steckenrider et al. do not contain hydrogen peroxide or any oxidizing agent. Conversely, the compositions of Steckenrider et al. contain amines, specifically alcoholamines, while the compositions of Morrison et al. contain quaternary ammonium salts. Notably, Steckenrider et al. distinguishes between amines and quaternary ammonium salts in Example 2. Thus, each of Steckenrider et al. and Morrison et al. fails to disclose a critical component present in the other's compositions. The assumption that the selectivity of the compositions of Morrison et al. provide evidence that the compositions in Steckenrider et al. exhibit a similar oxide:nitride removal selectivity is not well-founded.

In view of the foregoing, the subject matter of the pending claims cannot properly be considered obvious over the cited references. Accordingly, Applicants respectfully request that the obviousness rejections be withdrawn.

Conclusion

Applicants respectfully submit that the patent application is in condition for allowance. If, in the opinion of the Examiner, a telephone conference would expedite the prosecution of the subject application, the Examiner is invited to call the undersigned attorney.

Respectfully submitted,



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